



Designation: A1031 – 05

Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Alloy, Drawing Steel and Structural Steel, Hot-Rolled¹

This standard is issued under the fixed designation A1031; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 This specification covers hot-rolled, heavy thickness coils beyond the size limits of Specifications A506 and A507.

1.2 The product is available in three designations: Alloy Steel, Drawing Steel, and Structural Alloy Steel.

1.3 Alloy steel is furnished to chemical composition requirements and is intended primarily for general or miscellaneous use where bending and moderate forming is a requirement.

1.4 Drawing steel is produced principally for applications involving severe cold plastic deformation such as deep drawn or severely formed parts.

1.4.1 Drawing steel may be furnished in several conditions, heat treatments, surface finishes, and edges, as specified herein.

1.5 Structural steel is furnished to chemical composition requirements and to specific mechanical property requirements which may include tension tests, hardness tests, or other commonly accepted mechanical tests.

1.5.1 The formability of structural steel decreases with increasing yield strength or hardness. Therefore, product design in relation to the mechanical properties of the grade used must be considered.

1.6 This material is available only in coils described as follows:

Product	Size Limits, Coils Only	
	Width, in. (mm)	Thickness, in. (mm)
Strip	Over 8 to 12, incl (Over 200 to 300)	0.230 to 1.000, incl (Over 6.0 to 25)
Sheet	Over 12 to 48, incl (Over 300 to 1200)	0.230 to 1.000, incl (Over 6.0 to 25)
Sheet	Over 48 (Over 1200)	0.180 to 1.000, incl (Over 4.5 to 25)

1.7 Sheet and strip in coils of sizes noted in 1.6 are covered by this specification only with the following provisions:

1.7.1 The material is not to be converted into steel plates for structural or pressure vessel use unless tested in complete accordance with the appropriate sections of Specifications A6/A6M (plates provided from coils) or A20/A20M (plates

produced from coils). A plate produced in this manner is no longer governed by this sheet steel specification and since this material is now plate, the appropriate plate standard must now apply.

1.7.2 The dimensional tolerances of Specification A635/A635M are applicable to material produced to this specification.

1.7.3 The material is to be fed directly from coils into a blanking press, drawing or forming operation, tube mill, rolling mill, or sheared or slit into blanks for subsequent drawing or forming.

1.8 The values stated in either inch-pound units and SI units (metric) are to be regarded separately as standard. Within the text the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system must be used independently of each other.

2. Referenced Documents

2.1 ASTM Standards:²

A6/A6M Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling

A20/A20M Specification for General Requirements for Steel Plates for Pressure Vessels

A370 Test Methods and Definitions for Mechanical Testing of Steel Products

A505 Specification for Steel, Sheet and Strip, Alloy, Hot-Rolled and Cold-Rolled, General Requirements for

A506 Specification for Alloy and Structural Alloy Steel, Sheet and Strip, Hot-Rolled and Cold-Rolled

A507 Specification for Drawing Alloy Steel, Sheet and Strip, Hot-Rolled and Cold-Rolled

A635/A635M Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Alloy, Carbon, Structural, High-Strength Low-Alloy, and High-Strength Low-Alloy with Improved Formability, General Requirements for

A751 Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products

¹ This specification is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel and Related Alloys and is the direct responsibility of Subcommittee A01.19 on Steel Sheet and Strip.

Current edition approved Dec. 1, 2005. Published December 2005. Originally approved in 2004. Last previous edition approved in 2004 as A1031 – 04. DOI: 10.1520/A1031-05.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

*A Summary of Changes section appears at the end of this standard.

TABLE 1 Standard Steels Commonly Produced for Alloy Steel Sheet and Strip

UNS Design.	SAE No.	Chemical Composition Ranges and Limits, % (Heat Analysis) ^A								
		C	Mn	P	S	Si ^B	Ni	Cr	Mo	V
...	E3310	0.08-0.13	0.45-0.60	0.025	0.025	0.15-0.30	3.25-3.75	1.40-1.75	...	...
G40120	4012	0.09-0.14	0.75-1.00	0.025	0.025	0.15-0.30	...	...	0.15-0.25	...
G41180	4118	0.18-0.23	0.70-0.90	0.025	0.025	0.15-0.30	...	0.40-0.60	0.08-0.15	...
G41300	4130	0.28-0.33	0.40-0.60	0.025	0.025	0.15-0.30	...	0.80-1.10	0.15-0.25	...
G41350	4135	0.33-0.38	0.70-0.90	0.025	0.025	0.15-0.30	...	0.80-1.10	0.15-0.25	...
G41370	4137	0.35-0.40	0.70-0.90	0.025	0.025	0.15-0.30	...	0.80-1.10	0.15-0.25	...
G41400	4140	0.38-0.43	0.75-1.00	0.025	0.025	0.15-0.30	...	0.80-1.10	0.15-0.25	...
G41420	4142	0.40-0.45	0.75-1.00	0.025	0.025	0.15-0.30	...	0.80-1.10	0.15-0.25	...
G41450	4145	0.43-0.48	0.75-1.00	0.025	0.025	0.15-0.30	...	0.80-1.10	0.15-0.25	...
G41470	4147	0.45-0.50	0.75-1.00	0.025	0.025	0.15-0.30	...	0.80-1.10	0.15-0.25	...
G41500	4150	0.48-0.53	0.75-1.00	0.025	0.025	0.15-0.30	...	0.80-1.10	0.15-0.25	...
G43200	4320	0.17-0.22	0.45-0.65	0.025	0.025	0.15-0.30	1.65-2.00	0.40-0.60	0.20-0.30	...
G43400	4340	0.38-0.43	0.60-0.80	0.025	0.025	0.15-0.30	1.65-2.00	0.70-0.90	0.20-0.30	...
G43406	E4340	0.38-0.43	0.65-0.85	0.025	0.025	0.15-0.30	1.65-2.00	0.70-0.90	0.20-0.30	...
G45200	4520	0.18-0.23	0.45-0.65	0.025	0.025	0.15-0.30	...	...	0.45-0.60	...
G46150	4615	0.13-0.18	0.45-0.65	0.025	0.025	0.15-0.30	1.65-2.00	...	0.20-0.30	...
G46200	4620	0.17-0.22	0.45-0.65	0.025	0.025	0.15-0.30	1.65-2.00	...	0.20-0.30	...
G47180	4718	0.16-0.21	0.70-0.90	0.025	0.025	0.15-0.30	0.90-1.20	0.35-0.55	0.30-0.40	...
G48150	4815	0.13-0.18	0.40-0.60	0.025	0.025	0.15-0.30	3.25-3.75	...	0.20-0.30	...
G48200	4820	0.18-0.23	0.50-0.70	0.025	0.025	0.15-0.30	3.25-3.75	...	0.20-0.30	...
G50150	5015	0.12-0.17	0.30-0.50	0.025	0.025	0.15-0.30	...	0.30-0.50	...	...
G50460	5046	0.43-0.50	0.75-1.00	0.025	0.025	0.15-0.30	...	0.20-0.35	...	...
G51150	5115	0.13-0.18	0.70-0.90	0.025	0.025	0.15-0.30	...	0.70-0.90	...	...
G51200	5120	0.17-0.22	0.70-0.90	0.025	0.025	0.15-0.30	...	0.70-0.90	...	...
G51300	5130	0.28-0.33	0.70-0.90	0.025	0.025	0.15-0.30	...	0.80-1.10	...	...
G5132	5132	0.30-0.35	0.60-0.90	0.025	0.025	0.15-0.30	...	0.75-1.00	...	...
G51400	5140	0.38-0.43	0.70-0.90	0.025	0.025	0.15-0.30	...	0.70-0.90	...	...
G51500	5150	0.48-0.53	0.70-0.90	0.025	0.025	0.15-0.30	...	0.70-0.90	...	...
G51600	5160	0.55-0.65	0.75-1.00	0.025	0.025	0.15-0.30	...	0.70-0.90	...	...
G15116	E51100	0.95-1.10	0.25-0.45	0.025	0.025	0.15-0.30	...	0.90-1.15	...	...
G15216	E52100	0.95-1.10	0.25-0.45	0.025	0.025	0.15-0.30	...	1.30-1.60	...	...
G61500	6150	0.48-0.53	0.70-0.90	0.025	0.025	0.15-0.30	...	0.80-1.10	...	0.15 min
G61580	6158	0.55-0.62	0.70-1.10	0.025	0.025	0.15-0.30	...	0.90-1.20	...	0.10-0.20
G86150	8615	0.13-0.18	0.70-0.90	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86170	8617	0.15-0.20	0.70-0.90	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86200	8620	0.18-0.23	0.70-0.90	0.035	0.035	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86300	8630	0.28-0.33	0.70-0.90	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86400	8640	0.38-0.43	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86420	8642	0.40-0.45	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86450	8645	0.43-0.48	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86500	8650	0.48-0.53	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86550	8655	0.50-0.60	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G86600	8660	0.55-0.65	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.15-0.25	...
G87200	8720	0.18-0.23	0.70-0.90	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.20-0.30	...
G87350	8735	0.33-0.38	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.20-0.30	...
G87400	8740	0.38-0.43	0.75-1.00	0.025	0.025	0.15-0.30	0.40-0.70	0.40-0.60	0.20-0.30	...
G92600	9260	0.55-0.65	0.70-1.00	0.025	0.025	1.80-2.20	...	...	...	...
G92620	9262	0.55-0.65	0.75-1.00	0.025	0.025	1.80-2.20	...	0.25-0.40	...	...
...	E9310	0.08-0.13	0.45-0.65	0.025	0.025	0.20-0.35	3.30-35.0	1.00-1.40	0.08-0.15	...

^A The chemical ranges and limits shown are subject to product analysis tolerances. See Specification **A505**.

^B Other silicon ranges are available. Consult the producer.

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

3. General Requirements for Delivery

3.1 Material furnished under this specification shall conform to the applicable requirements of Specification **A505**, current edition, unless otherwise provided herein.

4. Ordering Information

4.1 Orders for material under this specification shall include the following information, as required, to adequately describe the desired material.

4.1.1 ASTM specification number and year of issue,

4.1.2 Classification of the material (hot-rolled sheet or hot-rolled strip),

4.1.3 Chemical composition (grade),

4.1.4 Condition—Material in accordance with this specification is furnished in the hot rolled condition. Pickled (or blast cleaned) must be specified if required. Material ordered as pickled (or blast cleaned) will be oiled unless ordered dry,

4.1.5 Heat treatment required, if any,

4.1.6 Type of edge must be specified for hot rolled sheet coils and strip coils, either mill edge or cut edge (sheet), mill edge or slit edge (strip),

4.1.7 Dimensions (decimal thickness and width of material),

4.1.7.1 As agreed upon between the purchaser and the producer, material ordered to this specification will be supplied to meet the appropriate standard or restricted thickness tolerances shown in Specification **A635/A635M**,